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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of)
Kazuhiko MARUYAMA) Group Art Unit: 2683
Serial No. 09/355,732) Examiner: Lee Nguyen
Filed: August 4, 1999) September 5, 2002
For: METHOD OF RADIO CHANNEL)
ASSIGNMENT FOR RADIO)
COMMUNICATION)

RECEIVED

SEP 10 2002

Technology Center 2600

TRANSMITTAL OF APPEAL BRIEF

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Enclosed in connection with the above-referenced application is an Appeal Brief with Appendix in triplicate. A check is enclosed to cover the following fees: \$320.00 to cover the fee for filing a brief in support of a notice of appeal.

Also, please charge any additional fees or credit any overpayment to Deposit Account No. 02-2135. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

ROTHWELL, FIGG, ERNST & MANBECK, p.c.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of) **BEFORE THE BOARD OF PATENT**
Kazuhiko MARUYAMA) **APPEALS AND INTERFERENCES**
Serial No. 09/355,732) Appeal No.:
Filed: August 4, 1999) Examiner: Lee Nguyen
For: METHOD OF RADIO CHANNEL) Group Art Unit: 2683
ASSIGNMENT FOR RADIO)
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BRIEF ON APPEAL

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

This is an appeal from the final rejection of claims 13-15, 18, 19, 21, 24, 25 and 31-35 of the above-identified application, which claims were finally rejected in the Office action dated March 5, 2002. A Notice of Appeal was timely filed on July 5, 2002.

REAL PARTY IN INTEREST

The real party in interest in this case is Mitsubishi Denki Kabushiki Kaisha of Tokyo, Japan.

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RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the present appeal.

STATUS OF THE CLAIMS

Claims 13-35 are pending in the application. Claims 1-12 are cancelled. Claims 16, 17, 20, 22, 23 and 26-30 are allowed, and claims 13-15, 18, 19, 21, 24, 25 and 31-35 stand finally rejected. Claims 13, 14, 15, 18 and 31 constitute the independent claims on appeal. This appeal is directed to claims 13-15, 18, 19, 21, 24, 25 and 31-35.

STATUS OF AMENDMENTS

The Advisory action dated June 12, 2002 indicated that the amendment after final filed June 5, 2002 would be entered upon appeal.

SUMMARY OF THE INVENTION

The present invention relates generally to the field of radio communications, such as cellular telephone communication systems, wherein a fixed base station communicates with a number of portable radio communication terminals within its range or radio zone, and more particularly to a method of dynamically assigning radio communication channels to portable radio communication terminals to maintain an acceptable transmission speed while also maintaining efficient use of the transmission capacity of the system.

Unlike conventional telephone (i.e. voice) communication wherein the amount of voice signal information is relatively constant, data communication exhibits significant increases and decreases of the amount of data to be transmitted at any point in time. Such changes in data amount can be caused by any of a number of factors, including the state of access to the data by the receiving terminal, the amount of use of data processing capacity by the receiving terminal, the amount of data requested by the receiving terminal, etc.

Thus, while portable or mobile radio communication terminals carrying out conventional voice communications can be assigned to a radio channel of fixed transmission capacity, when the same approach is used for carrying out data communications, unsatisfactory conditions arise. In particular, when the amount of communication data increases, if the communication terminal remains assigned to a channel of fixed capacity, the resources for the communication terminal will become insufficient, resulting in unsatisfactory transmission speed. On the other hand, when the amount of communication data decreases and the communication terminal remains assigned to a fixed capacity channel, the amount of unused resources increases, resulting in inefficient use of the system.

Prior art approaches to this problem have consisted of allocating additional channels to a communication terminal based on an instantaneous amount of data to be transmitted, see Kamm et al., U.S. Patent No. 5,457,680 of record. However, such prior art approaches do not take into consideration the extent of the amount of data increase or

decrease over a period of time in deciding whether or not to allocate an additional channel, and further do not take into consideration the availability of adjacent, contiguous channels to the presently assigned channel.

According to one embodiment of the invention, as shown in Fig. 2, a mobile radio terminal (5A-5F) includes an amount-of-data monitor 12 that monitors the amount of data to be transmitted as stored in buffer 11. Similarly, an individual base station (1A-1F) of base station system 1 includes an amount-of-data buffer 24 that monitors the amount of data to be transmitted as stored in buffer 23. A controller 13 of the mobile radio terminal determines the required channel capacity for communication based on the result of monitoring of the amount of data in the buffer 11 by the monitor 12, and sends a change request message to the base station controlling the radio zone in which the mobile terminal is located. Similarly, in the case of data to be transmitted to the mobile radio terminal, the controller 24 of the base station determines required channel capacity based on the result of monitoring of the amount of data stored in buffer 23 by monitor 24, and sends an instruction to the mobile terminal regarding the identification of radio communication channels to which the mobile terminal is to be assigned for communication. The operation of the method is described in the specification at page 8, line 2, to page 12, line 15.

According to the third embodiment of the invention as described at page 19, the communication channel assignment is varied based on the rate of change of communication data to be transmitted per unit time, which allows greater efficiency of use of a limited number of channels while speeding up data communication. This embodiment

of the invention is set forth in claims 13 and 14.

According to another aspect of the invention as set forth in claim 15 and described at pages 19 and 20 as the fourth embodiment of the invention, when a particular mobile radio terminal moves from the radio zone of a first base station to the radio zone of a second base station, and therefore needs to be "handed off" by the first base station to the second base station, the first base station communicates to the second base station the number of radio channels assigned to the mobile terminal up to the point of transfer, so as to reduce the amount of time required for the second base station to determine the number of communication channels to assign to the newly transferred mobile terminal, and thus improve transmission speed and efficiency.

Finally, according to yet another aspect of the invention as set forth in claims 18 and 31, in response to a request from either the mobile terminal or the base station for an increase in the number of assigned radio communication channels, it is first determined whether a sufficient number of radio channels adjacent to the presently assigned channel(s) are unassigned or not. If the adjacent channels are unassigned, they are then assigned to the mobile terminal as the additional channels. If the adjacent are presently assigned to other mobile terminals, and a sufficient number of other channels are unassigned, then the other mobile terminals are first re-assigned to the unassigned communication channels, and then the resulting free adjacent channels are assigned to the mobile terminal as the additional requested channels. This aspect of the invention is illustrated in Figs. 3(A)-3(B) and 6(A)-6(B) respectively, and described in the specification at page 9, lines 19-28, and

ISSUES

This appeal presents the following issues for decision by the Board:

- 1) Whether claims 13 and 31-33 are unpatentable under 35 U.S.C. § 102(b) as being anticipated by Kamm et al., U.S. Patent No. 5,457,680 ("Kamm") and are properly rejected on that basis;
- 2) Whether claim 14 is unpatentable under 35 U.S.C. § 102(b) as being anticipated by Dunn et al., U.S. Patent No. 5,625,877 ("Dunn") and is properly rejected on that basis;
- 3) Whether claim 15 is unpatentable under 35 U.S.C. § 103(a) over Bruckert et al., U.S. Patent No. 5,781,583 in view of Nakagoshi et al., U.S. Patent No. 5,799,252 and is properly rejected on that basis;
- 4) Whether claims 34 and 35 are unpatentable under 35 U.S.C. § 103(a) over Kamm in view of Krebs et al., U.S. Patent No. 5,448,759 ("Krebs") and are properly rejected on that basis;
- 5) Whether claims 18, 19, 21 and 25 are unpatentable under 35 U.S.C. § 103(a) over Kamm in view of Dunn; and
- 6) Whether claim 24 is unpatentable under 35 U.S.C. § 103(a) over Kamm in view of Dunn and further in view of Krebs, and is properly rejected on that basis.

GROUPING OF CLAIMS

Claims 31-33 do not stand or fall together with claim 13 in the blanket rejection of claims 13 and 31-33, but are separately argued below.

ARGUMENT

The Rejection of Claims 13 and 31-33 Is Improper

The rejection of claim 13 and 31-33 as being anticipated by Kamm et al., U.S. Patent No. 5,457,680 ("Kamm") is improper and should be reversed. The Examiner alleges that Kamm discloses in Fig. 1K, steps 622-626, determination of a number of radio channels to be assigned to a first radio terminal according to the rate of increase of stored data to be transmitted per unit time.

To the contrary, steps 622-626 of Fig. 1K are simply the reverse channel analog of the forward channel steps 614-618. Specifically, Kamm allocates an additional channel when the either the forward or reverse channel data packet size is greater than a threshold value. Kamm does not determine any rate of increase of stored data per unit time as required by claim 13.

With respect to claims 31-33, Kamm simply discloses that an additional slot is allocated, if available. Kamm is completely silent as to what is done if the additional slot is unavailable; Kamm does not disclose reassigning the first radio terminal to a predetermined number of other unassigned adjacent radio channels, if a predetermined number of radio channels adjacent to an assigned channel of the first radio terminal are not unassigned.

The Office action has not even made out a *prima facie* case of anticipation with respect to claims 31-33. The Office action asserts only that Kamm discloses "if the slots are

available assign to the first radio unit and if the slots (reads on the claimed assigning and reassigning, col. 10, line 15)" (sic).

The Rejection of Claim 14 Is Improper

The rejection of claim 14 as being anticipated by Dunn also is improper and should be reversed. Dunn simply determines whether to aggregate channels based on the size of a communication awaiting transmission (see col. 12, ll. 66-67; col. 13, ll. 1-4). Dunn does not determine whether to allocate an additional radio channel according to a rate of increase of stored data per unit time, as set forth in claim 14. The Advisory action simply repeats the contrary assertion that Dunn discloses the method of claim 14 at col. 12, line 66 to col. 13, line 22. Applicant has read and re-read this passage of Dunn multiple times but still is unable to see where the invention set forth in claim 14 is disclosed by Dunn.

The Rejection of claim 15 Is Improper

The rejection of claim 15 as being unpatentable over Bruckert in view of Nakagoshi is improper and should be reversed. The Examiner asserts that Nakagoshi teaches exchanging information regarding channels in a handover between base stations, and proposes to modify Bruckert to include such feature.

In contrast to the claimed invention, Nakagoshi discloses a handover process in which a radio terminal does not have to switch to a new radio channel in order to transfer communication to a new base station, by "equalizing" the radio channel used between the

new base station and the radio terminal to be the same as the radio channel used between the old base station and the radio terminal. This procedure is described in detail at col. 6, line 64 to col. 7, line 3, and is the procedure referred to in the summary language at col. 4, ll. 10-14, which is the only portion of Nakagoshi relied upon by the Examiner to support the rejection. It is clearly improper to ignore the detailed description of a disclosure in favor of reliance on broad summary language which may be more easily misinterpreted to correspond to the claim language at issue, as the Examiner has done in this case.

There is in Nakagoshi no communication between base stations of the number of radio channels that were assigned to the radio terminal for communication with the first base station, so that the second base station may assign an equal number to the radio terminal upon completion of the handover operation. Thus, the Examiner's position is incorrect and should be reversed.

The Rejection of claims 34 and 35 Is Improper

The rejection of claims 34 and 35 as being unpatentable over Kamm in view of Krebs is improper and should be reversed. Krebs relates to the use of a central processor for determining whether a message intended for a communication unit is of a first, second or third bandwidth. Depending upon the result of the determination, the processor transmits the message to the communication unit over a communication resource that is appropriate for the determined bandwidth. According to Krebs, the communication resource for the third bandwidth message is a multiple consecutive time slot communication

channel. Krebs does not suggest reassignment of existing assigned channels to make available adjacent radio channels for assignment to a radio terminal in response to a request for an increase in assigned channels.

Krebs fails to cure the deficiencies of Kamm with respect to claim 31; as such no combination of Kamm with Krebs could result in the invention of claims 34 and 35. Consequently, this ground of rejection should be reversed.

The Rejection of Claims 18, 19, 21 and 25 Is Improper

Claims 18, 19, 21 and 25 are rejected as being unpatentable over Kamm in view of Dunn. This ground of rejection also is respectfully submitted to be improper and should be reversed. The Examiner states that claim 18 is interpreted the same as claim 31.

Consequently, the rejection is improper because Kamm fails to disclose any reassignment of a radio terminal to a predetermined number of unassigned adjacent radio channels if no predetermined number of radio channels adjacent to an assigned radio channel of the radio terminal exist.

The Rejection of claim 24 Is Improper

The Examiner adds the Krebs reference to Kamm and Dunn to reject claim 24; however the rejection is improper because Krebs fails to cure the basic deficiencies of the prior art with respect to independent claim 18 as explained above. Accordingly, this ground of rejection must be reversed.

CONCLUSION

In view of the foregoing, claims 13-15, 18, 19, 21, 24, 25 and 31-35 are submitted to be directed to a new and unobvious method for assigning radio communication channels between a base station and a plurality of radio terminals, which is not taught or suggested by the prior art. The Honorable Board is respectfully requested to reverse all grounds of rejection and to direct the passage of this application to issue.

Please charge any fee or credit any overpayment pursuant to 37 CFR 1.16 or 1.17 to Deposit Account No. 02-2135.

Respectfully submitted,

ROTHWELL, FIGG, ERNST & MANBECK, p.c.

By

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APPENDIX OF CLAIMS ON APPEAL

13. A radio channel assignment method for assigning radio channels for carrying out radio communication between a base station and a plurality of radio terminals in a radio zone of said base station, comprising the step of said base station determining a number of radio channels to be assigned to a first radio terminal according to the rate of increase of stored data to be transmitted per unit time.

14. A radio channel assignment method for assigning radio channels for carrying out radio communication between a base station and a plurality of radio terminals in a radio zone of said base station, comprising the step of each of said radio terminals determining a number of radio channels to be assigned to itself according to the rate of increase of stored data to be transmitted by that radio terminal per unit time.

15. A radio channel assignment method for assigning radio channels for carrying out radio communication between a first base station and a plurality of radio terminals in a radio zone of said base station, comprising the step of said first base station transmitting to a second base station having a second radio zone, upon occurrence of a hand-over of communication with a first radio terminal from said first base station to said second base station, the number of radio channels that were assigned to said first radio terminal for communication with said first base station, such that said second base station may assign

an equal number of radio channels in said second radio zone to said first radio terminal upon completion of said hand-over.

18. A radio channel assignment method for assigning radio channels for carrying out communications between a base station and a plurality of radio terminals in a radio zone of the base station, comprising the steps of:

- assigning at least one radio channel to a first radio terminal in said radio zone;

- determining the amount of communication data to be sent from said first radio terminal to said base station;

- when the amount of communication data is determined to be above a predetermined threshold representing acceptable data transmission capacity for the number of presently assigned radio channels, requesting of said base station an increase in the number of radio channels assigned to said first radio terminal;

- when the amount of communication data is determined to be below a predetermined threshold representing acceptable data transmission capacity for the number of presently assigned radio channels, requesting of said base station a decrease in the number of radio channels assigned to said first radio terminal;

- in response to a request for an increase in the number of radio channels assigned to said first radio terminal, determining whether a predetermined number of radio channels in said radio zone adjacent to the radio channel assigned to said first radio terminal are unassigned, and if so assigning said predetermined number of adjacent radio channels to said first radio terminal; if a predetermined number of radio channels in said radio zone

adjacent to the radio channel assigned to said first radio terminal are not unassigned, reassigning said first radio terminal to a predetermined number of other unassigned adjacent radio channels in said radio zone.

19. The radio channel assignment method of claim 18, wherein when said amount of communication data is below said predetermined threshold, one radio channel is assigned to said first radio terminal, and when said amount of communication data is above said predetermined threshold, a plurality of adjacent radio channels are assigned to said first radio terminal.

21. The radio channel assignment method of claim 18, further comprising the step of decreasing the number of radio channels assigned to said first radio terminal upon receipt of a request for an assignment of a radio channel in said radio zone by a second radio terminal having no assigned radio channel in said radio zone.

24. The radio channel assignment method of claim 18, wherein said radio channels in said radio zone are frequency division multiple access channels.

25. The radio channel assignment method of claim 18, wherein said radio channels in said radio zone are time division multiple access channels.

31. A radio channel assignment method for assigning radio channels for carrying out communications between a base station and a plurality of radio terminals in a radio zone of the base station, comprising the steps of:

assigning at least one radio channel to a first radio terminal in said radio zone;

determining the amount of communication data to be sent from said first radio terminal to said base station;

when the amount of communication data is determined to be above a predetermined threshold representing acceptable data transmission capacity for the number of presently assigned radio channels, requesting of said first radio terminal an increase in the number of radio channels assigned to said first radio terminal;

when the amount of communication data is determined to be below a predetermined threshold representing acceptable data transmission capacity for the number of presently assigned radio channels, requesting of said first radio terminal a decrease in the number of radio channels assigned to said first radio terminal;

in response to a request for an increase in the number of radio channels assigned to said first radio terminal, determining whether a predetermined number of radio channels in said radio zone adjacent to the radio channel assigned to said first radio terminal are unassigned, and if so assigning said predetermined number of adjacent radio channels to said first radio terminal; if a predetermined number of radio channels in said radio zone adjacent to the radio channel assigned to said first radio terminal are not unassigned,

reassigning said first radio terminal to a predetermined number of other unassigned adjacent radio channels in said radio zone.

32. The radio channel assignment method of claim 31, wherein when said amount of communication data is below said predetermined threshold, one radio channel is assigned to said first radio terminal, and when said amount of communication data is above said predetermined threshold, a plurality of adjacent radio channels are assigned to said first radio terminal.

33. The radio channel assignment method of claim 31, further comprising the step of decreasing the number of radio channels assigned to said first radio terminal upon receipt of a request for an assignment of a radio channel in said radio zone by a second radio terminal having no assigned radio channel in said radio zone.

34. The radio channel assignment method of claim 31, wherein said radio channels in said radio zone are frequency division multiple access channels.

35. The radio channel assignment method of claim 31, wherein said radio channels in said radio zone are frequency division multiple access channels.